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KENYON & KENYON
333 W. San Carlos Street, Suite 600
San Jose, CA 95110-2711

EXAMINER

SAXENA, AKASH

ART UNIT	PAPER NUMBER
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2128

DATE MAILED: 04/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/982,061	Applicant(s) MONROE, ERIC M.	
	Examiner Akash Saxena	Art Unit 2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 October 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 October 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |



DETAILED ACTION

1. Claims 1-22 have been presented for examination based on the application filed on 17 October 2001.

Drawings

2. The drawing (Figure 2) is objected to under 37 CFR 1.83(a) because they fail to show the interface to enter user information clearly, as described in the specification. The drawing is too dark as to be clearly read. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
 - (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
 - (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
 - (d) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC (See 37 CFR 1.52(e)(5) and MPEP 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text are permitted to be submitted on compact discs.) or
REFERENCE TO A "MICROFICHE APPENDIX" (See MPEP § 608.05(a). "Microfiche Appendices" were accepted by the Office until March 1, 2001.)
 - (e) BACKGROUND OF THE INVENTION.
 - (1) Field of the Invention.
 - (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
 - (f) BRIEF SUMMARY OF THE INVENTION.
 - (g) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
 - (h) DETAILED DESCRIPTION OF THE INVENTION.
 - (i) CLAIM OR CLAIMS (commencing on a separate sheet).
 - (j) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
 - (k) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).
3. The current specification is missing BRIEF SUMMARY OF THE INVENTION.

Appropriate action is required.

Claim Interpretation

4. Following phrases in the claims below are interpreted as follows:
- a. Claim 2: The phrase “product transfer cycle” as best understood by examiner applies to the laptops when they are moved around and/or put in “hibernate modes”.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

- 5. Claim 1-3 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.**

Regarding Claim 1

The model as disclosed in the specification is based on mathematical Coffin-Manson empirical model. It appears that this calculation can be mental step that a human could perform, hence is non-statutory. But, As suggested by the applicant in specification that computing total number of accelerated cycles requires adding various probability density functions (Specification: Page 11, Lines 22-27), and it implemented through a program interface (Specification: Page 8, Lines 1), it should be claimed as such.

Claims 2-3 are rejected on basis their dependency upon claim 1.

Examiner respectfully suggests supplementing the claim with phrase like “A computer implemented method, tangibly embodied on a computer readable storage medium, which when executed will quantify the reliability test requirements ...” to bring the claim into the technological arts.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 1-5 & 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over “Intel Technology Journal Q3, 2000” by Nicholas P. Mencinger et al (Mencinger hereafter) in view of “Application Specific Semiconductor Device Qualification Methodology (Paper & presentation)” by Matt Doty (December 1999) (Doty hereafter).

Regarding Claim 1

Mencinger teaches

“A method of quantifying the reliability test requirements of a package/chip device over a product lifetime comprising:
modeling different types of ambient and power-driven temperature cycle fluctuations the package/device is expected to undergo over the product lifetime;”

as a methodology to model failure and reliability (Mencinger: Page 2, Col.1, Lines 5-7) for various failure mechanisms for chips and packages (Mencinger: Page 2,

Col.1, Lines 17-19) over a product life time for various temperature and power cycle fluctuations (Mencinger: Page 2, Col.1, Lines 35-38, 49-51; Table 1).

Mencinger also teaches:

"and determining the accelerated life test requirements that represent each of the different types of temperature cycles fluctuations."

as determining accelerated life tests requirements (Mencinger: Page 4, Table 2) for one example. Further, Mencinger teaches the Coffin-Manson empirical model as an example which although is not claimed by the application but used in specification.

Mencinger does not disclose accelerated life tests requirements for other situations.

Doty teaches that all ambient and power-driven temperature cycle fluctuations can be modeled generically for each application in four phases (Doty: Slide 3). Doty proceeds to give requirements for accelerated life tests for various lifetimes & environments (Doty: Slide 5) and stress conditions (Doty: Slide 6).

It would have been obvious to one (e.g. a designer) of ordinary skill in the art at the time the invention was made to combine the teachings of Doty and Mencinger to create a model for ambient and power-driven temperature cycle fluctuations for various situations. The motivation would have been that Doty's discloses the requirements/parameters for accelerated life test for various ambient and power driven fluctuation situations (Doty: Slides 5 &6) and Mencinger teaches that a package/processor lifetime can be broken down into different types of fluctuations from the point it manufactured till the end of the package/processor lifetime. Further, Mencinger cites Doty's and others teachings as references in his paper.

Regarding Claim 2

Mencinger teaches different types of ambient and power-driven temperature cycles as storage cycles (Mencinger: Page 2, Col. 2, Line 1; Table 1), on/idle operation cycles as expected Duty cycle (Mencinger: Page 2, Col. 1, Line 51; Table 1), power on/off (Mencinger: Page 2, Col. 1, Line 51; Table 1), application use cycles within and between program use as suspend/resume cycles (Mencinger: Page 2, Table 1), and product transfer cycles (Mencinger: Page 3, Col. 2, Line 14-19) and shipping cycles for temperature fluctuations (Mencinger: Page 4, Table 2, 3rd Row).

Regarding Claim 3

Mencinger teaches that test requirements depend upon market application use of package/chip device and further goes on to list 3 exemplary market/applications (Mencinger: Page 4, Table 2, 1st Row). Doty also teaches that there are various markets/applications that have different environments (Doty: Slide 2).

Regarding Claim 4

Mencinger teaches through example how accelerated life test parameters used to assess reliability of a package/chip to expected frequencies and magnitudes of temperature cycle fluctuation encountered can be modeled. He uses Flip-Chip application environment (Mencinger: Page 4, Failure Mechanism Modeling). He also teaches that model used is the baseline model from white papers by Both Sematech's RTAB and Intel. The application defined in this case is flip-chip package going through thermal cycling. The quantifying expected frequency (Mencinger: Page 4, Failure Mechanism Modeling - 1500 cycles) and magnitude (Mencinger: Page 4, Failure Mechanism Modeling – $\Delta T = 40$ degree centigrade) is provided

for the end user environment temperature regime. Coffin-Manson accelerated life model is used by Mencinger to incorporate the end user environment temperature regime (Mencinger: Page 5, Col.1, Lines 1-6; Table 3) exemplified. The incorporation together with Delta-T vs. Accelerated Cycle counts and acceleration mechanism component yields the number-of-cycles-require to stress test with the model (Mencinger: Page 5, Col.2, Figure 3). Hence Mencinger directly teaches all the limitations of this claim.

Mencinger does not teach plurality of temperature cycle fluctuation regimes, instead gives an exemplary regime showing all the limitation of the claim.

Doty teaches plurality of temperature cycle fluctuation regimes for the operation life cycle of the package/chip as power up/down (0-50 degree C, 10 time a day), ambient temperature excursions per day (0-40 degree C, 2 times a day) and associated accelerated lifecycles with such fluctuation regimes (Doty: Slide 2, Col.1, Operational Life, Col.2. Stress Condition).

It would have been obvious to one (e.g. a designer) of ordinary skill in the art at the time the invention was made to combine the teachings of Doty and Mencinger to create a model for ambient and power-driven temperature cycle fluctuations for various situations. The motivation would have been that Doty's discloses the requirements/parameters for accelerated life test for various ambient and power driven fluctuation situations (Doty: Slides 5 &6) and Mencinger teaches that a package/processor lifetime can be broken down into different types of fluctuations from the point it manufactured till the end of the package/processor lifetime. Further, Mencinger cites Doty's and others teachings as references in his paper.

Art Unit: 2128

Regarding Claim 5

Mencinger teaches different types of ambient and power-driven temperature cycles as storage cycles (Mencinger: Page 2, Col. 2, Line 1; Table 1), on/idle operation cycles as expected Duty cycle (Mencinger: Page 2, Col. 1, Line 51; Table 1), power on/off (Mencinger: Page 2, Col. 1, Line 51; Table 1), application use cycles within and between program use as suspend/resume cycles (Mencinger: Page 2, Table 1), and product transfer cycles (Mencinger: Page 3, Col. 2, Line 14-19) and shipping cycles for temperature fluctuations (Mencinger: Page 4, Table 2, 3rd Row).

Regarding Claim 16

Method claim 16 is directed towards the same limitations as the method claims 4 & 5 and is rejected for the same reason as claims 4 & 5.

- 7. Claims 6-12, 14, 17-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over “Intel Technology Journal Q3, 2000” by Nicholas P. Mencinger et al (Mencinger hereafter) in view of “Application Specific Package Qualification Specification – Overview of the Project” by Matt Doty, Amkor (December 1999) (Doty hereafter) and further in view of “ReliaSoft’s ALTA 1.0 On Site Training Guide – 1999” by ReliaSoft Corporation (ALTA 1.0 Hereafter).**

Regarding Claim 6

Mencinger & Doty teach limitation related to collecting user, application and environment data as disclosed in claims 4 & 5 from which claim 6 depend.

Mencinger & Doty do not teach providing a program interface to enter user specified parameters.

ALTA 1.0 teaches a software interface to provide reliability and failure analysis based temperature, humidity and voltage (ALTA 1.0: Page 4, Lines 2-3). ALTA 1.0 teaches program interface to enter user/environment inputs such as temperature (ALTA 1.0: Page 8, 1st Figure), warranty life (ALTA 1.0: Page 21, Method 2, Step 3; Page 22; 1st Figure showing Mission End Time as warranty life). Further, ALTA 1.0 teaches that subroutines based on user selection & model selected calculates the parameters (ALTA 1.0: Page 10, Lines 5-9) and then displays them to the end user (ALTA 1.0: Page 10, 1st Figure).

It would have been obvious to one (e.g. a designer) of ordinary skill in the art at the time the invention was made to combine the teachings of Mencinger & Doty with ALTA 1.0 software interface to create a software which would determine power (proportional to voltage) and temperature fluctuation based reliability & failure

Art Unit: 2128

estimation based on the Coffin Manson empirical formula. The motivation would have been that ALTA 1.0 teaches automated reliability calculation based on Inverse Power Law Model (ALTA 1.0: Page 15, 2nd Figure: Stress Life Relationship) and Coffin Manson empirical formula taught by Mencinger is also inverse power law model. ALTA 1.0 teaches automation with a various models and Mencinger teaches a slightly modified model, whose automation can very useful. Further, ALTA 1.0 teaches means of generating data & parameters using Monte Carlo Simulation Tool (ALTA 1.0: Page 4, 1st Figure: Button Icons 1st Row, 11th button; Page 58) from user input and Mencinger discloses use of such data to calculate the cycles-to-fail parameter based on Coffin Manson empirical formula (Mencinger: Page 5, Col.2, Figure 3).

Regarding Claim 7

Mencinger, Doty & ALTA 1.0's teachings are presented in claim 6 and its parent claims.

ALTA 1.0 does not teach separate routines for consumer application and environmental informational gathering. However along with Mencinger & Doty it presents functional equivalence to subroutines for collection of user data and application of such data to generate consumer behavior information like temperature fluctuation (ALTA 1.0: Page 4, 1st Figure: Button Icons 1st Row), lifetime model (Mencinger: Page 3, Figure 2), to generate application workload information (Doty: Page 7, Table 2) and to generate environmental conditions temperature fluctuations based on OEM input (Mencinger: Page 4, Table 2).

Regarding Claim 8

Mencinger teaches through exemplary calculations for estimating ambient temperature fluctuation frequencies for a temperature cycles regime (Mencinger: Page 4, Table 2; Page 5, Col.1, Lines 1-6; Table 3) based on user input and parameters calculated. Such calculations can be repeated for other temperature regimes for lifetime of a product based on other temperature regime data from other sources. Mencinger (Mencinger: Page 4, Col.1, Table 2, Row 4) & Doty (Doty: Page 7, Table 2: Duty Cycle) also talks about power driven temperature fluctuation for a temperature regime.

Regarding Claim 9

Doty teaches calculation of temperature profile from ambient, board, environment & junction fluctuation frequencies (Doty: Page 18, Figures 5 & 6). The temperature profiles include probability density function (*pdf*) for temperature fluctuation regime (Doty: Page 12, Section 5.8 Model for wear out failure. ALTA 1.0 also teaches variation of *pdf* with different stress factors (temperature, time) (ALTA 1.0: Page 38-42, 3.4.2 Example 7).

Regarding Claim 10

Doty teaches various temperature profiles to include rate of temperature change, dwell time, ramp times (Doty: Slide 6, Rows 2-3) for thermal shock and temperature cycling.

Regarding Claim 11

Mencinger teaches inputting user input, temperature fluctuations frequencies and temperature profiles into accelerated life model (Coffin Manson) to calculate the

number of accelerated test cycles required (Mencinger: Page 5, Col.1, Lines 1-6; Figure 3). Mencinger does not explicitly teach how to calculate the number of on/off power cycles required to simulate the on/off power fluctuations, but provides all the inputs for different applications (Mencinger: Page 4, Table 2), the formula (Mencinger: Page 5, Table 3) and the method (Mencinger: Page 5, Col.1, Lines 1-6; Figure 3) to calculate it. Mencinger selects a power law coefficient to select a particular modeling stress. Doty also teaches the process of incorporating the temperature fluctuations frequencies into Coffin-Manson empirical formula (Doty: Page 11, Section 5.6.8).

Regarding Claim 12

ALTA 1.0 teaches how the temperature profiles and *pdf* of the number of accelerated test cycles required can be outputted in tabular and graphical form (ALTA 1.0: Page 27: Section 2.6.2 – Shows Lifetime Vs Stress *pdf*; Page 40, 2nd Plot – Shows *pdf* Vs time (test cycles)). ALTA 1.0 does not show the same for on/off power cycle but sets precedence as to how the method and display should look like. ALTA 1.0 teaches the relationship between *pdf*, confidence level & number of test cycles and how to visualize it (ALTA 1.0: Page 23-27, Example 3; Page 37-42, Example 6).

Regarding Claim 14

Mencinger teaches the Coffin Manson model for thermo-mechanical methodology (Mencinger: Table 3). Mencinger also teaches the various ambient and usage power driven temperature cycle fluctuation regimes (Mencinger: {Page 2, Table 1 – Use

Art Unit: 2128

Conditions; Page 3, Col.2, Lines 14-19; Page 4, Table 2 – thermal and ambient fluctuations).

Mencinger does not teach modified Coffin Manson model explicitly in form of a formula as disclosed in the specification.

It would have been obvious to one (e.g. a designer) of ordinary skill in the art at the time the invention was made to take the Coffin Manson model as described by Mencinger to apply to the various temperature regimes, also described by Mencinger. The motivation would be that Mencinger lays out the modified formula by giving the breakdown in form of various temperature regimes except explicitly listing it as in the instant application. Hence, the next step and obvious step would have been to put in the form of the modified formula. There is no innovative step in this method claim.

Regarding Claim 17

Method claim 17 is directed towards the same limitations as the method claims 6 & 7 and is rejected for the same reason as claims 6 & 7.

Regarding Claim 18

Mencinger teaches warranty life as lifetime expectation and further categorizes them as OEM and user lifetime expectation (Mencinger: Page 2, Col.2, Lines 29-32) based on survey (Mencinger: Page 3, Col.1, Lines 15-16). Teachings about calculating a temperature profile and further limitations are rejected for the same reason as claim 9.

Art Unit: 2128

Regarding Claims 19 & 20

Apparatus claims 19 & 20 are directed towards the same limitations as the method claims 4, 5 & 6 and are rejected for the same reason as claims 4, 5 & 6. Claim 6 also discloses an interface, which ALTA1.0 teaches in sufficient detail to address program interface, computer-readable and executable limitations of this claim.

Regarding Claim 21

Apparatus claim 21 is directed towards the same limitations as the method claim 5 and is rejected for the same reason as claim 5.

Regarding Claim 22

Apparatus claim 21 is directed towards the same limitations as the method claims 8 & 9 and is rejected for the same reason as claims 8 & 9.

Art Unit: 2128

8. Claims 13 & 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over “Intel Technology Journal Q3, 2000” by Nicholas P. Mencinger et al (Mencinger hereafter) in view of “Application Specific Package Qualification Specification – Overview of the Project” by Matt Doty, Amkor (December 1999) (Doty hereafter) and further in view of “ReliaSoft’s ALTA 1.0 On Site Training Guide – 1999” by ReliaSoft Corporation (ALTA 1.0 Hereafter), further in view of “Semiconductor device reliability Failure Models” by Ted Dellin et al (Dellin hereafter), Sematech International.

Regarding Claim 13

Mencinger, Doty & ALTA 1.0’s teachings are presented in claim 11 and its parent claims. Mencinger, Doty & ALTA 1.0’s do not teach explicitly a modified Coffin Manson empirical formula/model.

Dellin teaches a modified Coffin Manson empirical formula for various temperature regimes that include creep and plasticity effects (Dellin: Page 19, Section G; Modified Coffin-Manson Model).

It would have been obvious to one (e.g. a designer) of ordinary skill in the art at the time the invention was made to take the Coffin Manson model as described Dellin and use it with teachings of Mencinger, Doty & ALTA 1.0 to make it more functionally useful. The motivation comes from Mencinger, as refers to industry accepted stress models to come from paper by Dellin (Sematech International) (Mencinger: Page 2, Col.2, Lines 21-25; Page 4, Col.2, Lines 13-18).

Art Unit: 2128

Regarding Claim 15

Dellin also teaches temperature fluctuation ratio includes a material property factor for temperature creep and plasticity (C_o) (Dellin: Page 19, Section G; Modified Coffin-Manson Model; Page 20, Lines 1-8).

Remarks

9. All claims are rejected.

Relevance of Citations

10. "Knowledge based Reliability Evaluation of New Package Technologies Utilizing Use Conditions" White paper by Intel in March 1999, Order Number: 245162-001; teaches use conditions as the basis for validating the reliability of package technologies. Further, it also teaches various models & mechanisms.
11. "IPL and Coffin Manson Relationship" – from Weibull statistical analysis web site showing relationship between the inverse power law and Coffin-Manson model.
12. "RAPSDRA: Reliability of advanced high power semiconductor devices for railway traction application" by Aramis Research 1998, <http://www.aramis-research.ch/d/5899.html>; teaches that analytical models for thermal cycles have been listed, critically reviewed, and implemented in MatLab. Almost all models make use of the Coffin-Manson law, where physical parameters like temperature exclusion or maximum stress are required to be entered as an input (section 4.3.2).

Art Unit: 2128

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Akash Saxena whose telephone number is (571) 272-8351. The examiner can normally be reached on 8:30 - 5:00 PM M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jean Homere can be reached on (571)272-3780. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Akash Saxena
Patent Examiner, GAU 2128
(571) 272-8351
March 21, 2005


JEAN R. HOMERE
PRIMARY EXAMINER